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# Time and Money:

## *The Far-Reaching Fiscal Impact of Demographic Change in Canada*

William B.P. Robson

***In this issue...***

*The interaction of demographic change with Canada's health, education, seniors' and children's programs creates a net liability of more than $300 billion for Canadian governments, with the provinces carrying the heavier load.*

## *The Study in Brief*

The changing age-profile of Canada's population makes estimates of implicit government assets and liabilities as demographic change interacts with key programs a useful supplement to standard government balance sheets.

Implicit assets arise when demographic change reduces spending relative to a benchmark level; implicit liabilities arise when it increases spending. Using program spending relative to gross domestic product in 2001 as a benchmark, this *Commentary* estimates implicit federal and provincial assets and liabilities associated with publicly funded health care and education, as well as elderly and child benefits.

Evaluated at a 6-percent discount rate over a 50-year time horizon, these programs add roughly $300 billion to the net liabilities of Canadian governments. Ottawa comes out ahead as a result of the prospect of declining spending on the Child Benefit. The provincial outlook is bleaker, with sizeable prospective increases in health-care spending only partially offset by declining education budgets.

These figures indicate that maintaining the current age/sex distribution of public expenditure in these programs will require taxpayers in the future to pay more for the entire package of public programs than their predecessors did. They also point to the desirability of continued budget surpluses and the need for greater fiscal capacity at the provincial level. Calculating the sensitivity of demographically driven assets and liabilities to assumptions about productivity growth rates also highlights the unique importance of growth-friendly economic policies to the sustainability of Canada's social programs.

## *The Author of This Issue*

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The prospect of significant changes in Canada's demographic structure has heightened interest in the probable evolution of major tax and public programs. If longer-term commitments grow more slowly than the capacity to pay, there may be room for new initiatives, or tax cuts, enhancing the fiscal package Canadian governments will present to future taxpayers, investors, and voters. However, if longer-run commitments threaten to outrun the capacity to pay, programs may be squeezed, taxes may rise, and future taxpayers — on the wrong end of an inter-generational deal they didn't sign — may force a renegotiation at the ballot box, disappear from the taxable economy or even emigrate.

These important, though difficult-to-predict prospects highlight the shortcomings of standard public-sector balance sheets. Traditional government financial statements owe much to business-sector accounting, and reflect a preoccupation with liquidity — specifically the ability of a public-sector entity to meet its obligations on time and in full. While attention to government cash balances and financing requirements remains important, economists, actuaries and others have become increasingly interested in governments' medium- and long-term financial positions.

## Augmenting Traditional Financial Statements

One approach to the challenge of outlining longer-term commitments is the use of generational accounts that show the changes in current programs and taxes needed to equalize the net fiscal benefits (programs received, less taxes paid) of the unborn with those of people currently alive.[1] This approach has failed to win a wide following, however, perhaps because the figures it produces are hard to compare with traditional measures of public-sector assets and liabilities.

This paper uses similar tools but emphasizes a different summary measure: the implicit asset or liability represented by predictable decreases or increases in expenditure resulting from demographic change. Implicit assets can be thought of as the amount of additional debt a government could carry and still meet its obligations at constant tax rates as demographic changes lower its program costs. In parallel fashion, implicit liabilities represent the amount of additional interest-bearing funds a government would need to hold to meet its obligations at constant tax rates as demographic changes increase its program costs.

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An earlier version of this study was presented in a C.D. Howe Institute session entitled "Demographic Change, Productivity Growth and Fiscal Outcomes" at the annual conference of the Canadian Economics Association, Carleton University, June 1, 2003, and it draws on and extends earlier work presented at the October 2002 conference "Is the Debt War Over?", sponsored by McGill University and the Institute for Research on Public Policy. I thank Pierre Lemieux, Jean-Claude Menard, David Walker and the participants in both conferences, especially Steve Ambler, Chris Matier, Jack Mintz, Chris Ragan, Byron Spencer and Bill Watson, for their comments and discussion. I also thank my colleagues Yvan Guillemette and Finn Poschmann for, respectively, assistance with the population projections and for extracting data on elderly and family benefits from the SPSD/M. Credit and blame for the conclusion and any defects are mine.

1 The seminal reference for generational accounting is Auerbach et al. (1994). Oreopoulos and Vaillancourt (1998) provide calculations of net lifetime tax burdens for Canadians of different ages.

## Preview of The Bottom Line

Taking these implicit amounts into account sheds important light on the scale of governments' commitments over time. The key message is that large implicit liabilities associated with health-care spending are the most significant long-term challenge facing Canadian governments — an implicit liability of $652 billion, discounted at a 6-percent interest rate — with the provinces bearing its brunt.[2] The implicit asset represented by coming declines in the share of gross domestic product (GDP) absorbed by public spending on education and allocated in child benefits provides partial offsets — some $263 billion and $103 billion, respectively. The total demographically driven net liability of Canadian governments related to these programs is just over $300 billion. Adding the unfunded liabilities of the Canada and Quebec Pension Plans (C/QPP), the offset represented by deferred taxes on private-pension saving, and standard measures of consolidated government debt, would produce a total figure for public-sector liabilities in Canada of $1.3 trillion.

These calculations are highly sensitive to assumptions about underlying productivity growth. The base-case figures just cited assume that output per person of traditional working age (the 15-to-64 age group) increases at a rate of 1.6 percent annually over the next half-century. Dropping the assumed rate of output growth to 1 percent annually raises the net implicit liability associated with health, education, elderly and children's programs from $300 billion to $900 billion — a figure that illustrates vividly the significance of growth-friendly economic measures in framing public policy to respond to the challenge of demographic change.

### *Approach*

In valuing the demographically driven implicit assets and liabilities in key government programs I take existing patterns of expenditure — usually by age, and in a couple of cases by sex, as well. Then, I use a population model of Canada and its provinces and territories to project expenditures forward on the basis of a handful of assumptions about inflation and servicing intensity — that is, real expenditures per person in the relevant age group. I then compare that growth path to the growth of GDP, projected in similar fashion from growth in the population of traditional working age and growth in output per person in that group.

If the existing pattern of expenditure implies a fall in the share of GDP allocated to a given program as the age structure of the population changes, that program creates an implicit asset for the government concerned. If the existing pattern of expenditure implies a rise in a program's share of GDP, the program creates an implicit liability. To reduce the data- and projection-oriented digressions in the presentation of the results, the following subsections preview the source data and outline their use in calculating the balance-sheet figures.

2 For convenience and brevity, I often use "province" and "provincial" to refer to provinces and territories together.

**Table 1:** ***Population by Major Age Group, 2001–2051***

| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | Change at Annual Rate 2001–51 |
|---|---|---|---|---|---|---|---|
| *Total* | | | | | | | |
| | | | | *000s* | | | % |
| *Canada Total* | *31,082* | *33,749* | *36,218* | *38,011* | *38,929* | *39,284* | *0.5* |
| Newfoundland | 534 | 531 | 527 | 505 | 465 | 418 | –0.5 |
| PEI | 139 | 142 | 145 | 144 | 140 | 133 | –0.1 |
| Nova Scotia | 943 | 970 | 990 | 985 | 953 | 905 | –0.1 |
| New Brunswick | 757 | 769 | 771 | 754 | 713 | 659 | –0.3 |
| Quebec | 7,411 | 7,752 | 8,029 | 8,123 | 8,005 | 7,779 | 0.1 |
| Ontario | 11,874 | 13,336 | 14,717 | 15,891 | 16,748 | 17,379 | 0.8 |
| Manitoba | 1,150 | 1,210 | 1,286 | 1,344 | 1,375 | 1,392 | 0.4 |
| Saskatchewan | 1,016 | 1,040 | 1,095 | 1,135 | 1,155 | 1,164 | 0.3 |
| Alberta | 3,064 | 3,380 | 3,613 | 3,757 | 3,800 | 3,764 | 0.4 |
| BC | 4,096 | 4,510 | 4,924 | 5,245 | 5,443 | 5,555 | 0.6 |
| Yukon | 30 | 30 | 32 | 31 | 30 | 29 | 0.0 |
| NWT and Nunavut | 69 | 79 | 89 | 97 | 102 | 106 | 0.9 |
| *Age 0–14* | | | | | | | |
| | | | | *000s* | | | % |
| *Canada Total* | *5,842* | *5,370* | *5,526* | *5,462* | *5,283* | *5,318* | *–0.2* |
| Newfoundland | 90 | 71 | 65 | 55 | 46 | 40 | –1.6 |
| PEI | 27 | 23 | 23 | 20 | 19 | 18 | –0.8 |
| Nova Scotia | 168 | 143 | 138 | 126 | 114 | 108 | –0.9 |
| New Brunswick | 134 | 115 | 107 | 96 | 84 | 77 | –1.1 |
| Quebec | 1,307 | 1,139 | 1,126 | 1,075 | 996 | 970 | –0.6 |
| Ontario | 2,284 | 2,190 | 2,323 | 2,391 | 2,382 | 2,454 | 0.1 |
| Manitoba | 238 | 220 | 231 | 229 | 222 | 227 | –0.1 |
| Saskatchewan | 216 | 191 | 201 | 197 | 189 | 193 | –0.2 |
| Alberta | 627 | 587 | 586 | 554 | 528 | 519 | –0.4 |
| BC | 725 | 669 | 699 | 694 | 679 | 688 | –0.1 |
| Yukon | 6 | 5 | 5 | 5 | 4 | 4 | –0.7 |
| NWT and Nunavut | 21 | 19 | 21 | 20 | 19 | 20 | –0.2 |

## *Population*

The population projections are from a model maintained at the C.D. Howe Institute. Adapted from the International Labor Organization Population Projection Model (ILO 2002), it enables us to make projections for each province and territory on the basis of a handful of assumptions about fertility, mortality and inter-provincial and international migration.

The key assumptions used are:

- Each province's total fertility rate remains at its 2001 level through the projection period;
- Life expectancies at birth by sex rise at rates akin to those in Statistics Canada's "medium" assumption for improvement in life expectancy;
- Net inter-provincial migration for each age/sex category decreases linearly from the 2001 figure to zero over 10 years (an approach that, while somewhat artificial, has the virtue of insulating the projections from the impact of assumptions in this area that are bound to be contentious, especially when

**Table 1:** ***Population by Major Age Group, 2001–2051*** *— continued*

| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | Change at Annual Rate 2001–51 |
|---|---|---|---|---|---|---|---|
| *Age 15–64* | | | | | | | |
| | | | | *000s* | | | *%* |
| *Canada Total* | *21,322* | *23,573* | *23,882* | *23,466* | *23 619* | *23,355* | *0.2* |
| Newfoundland | 380 | 380 | 344 | 302 | 268 | 230 | -1.0 |
| PEI | 93 | 98 | 93 | 87 | 83 | 76 | -0.4 |
| Nova Scotia | 649 | 676 | 642 | 590 | 559 | 519 | -0.4 |
| New Brunswick | 524 | 537 | 498 | 447 | 409 | 369 | -0.7 |
| Quebec | 5,143 | 5,404 | 5,225 | 4,901 | 4,785 | 4,552 | -0.2 |
| Ontario | 8,099 | 9,303 | 9,801 | 9,950 | 10,287 | 10,510 | 0.5 |
| Manitoba | 756 | 823 | 827 | 820 | 834 | 830 | 0.2 |
| Saskatchewan | 652 | 700 | 699 | 689 | 703 | 690 | 0.1 |
| Alberta | 2,126 | 2,396 | 2,413 | 2,337 | 2,289 | 2,191 | 0.1 |
| BC | 2,830 | 3,179 | 3,259 | 3,259 | 3,315 | 3,302 | 0.3 |
| Yukon | 22 | 22 | 22 | 21 | 21 | 20 | -0.2 |
| NWT and Nunavut | 46 | 55 | 60 | 63 | 65 | 66 | 0.7 |
| *Age 65 and over* | | | | | | | |
| | | | | *000s* | | | *%* |
| *Canada Total* | *3,918* | *4,805* | *6,810* | *9,083* | *10,027* | *10,610* | *2.0* |
| Newfoundland | 63 | 80 | 119 | 148 | 151 | 147 | 1.7 |
| PEI | 18 | 21 | 30 | 37 | 38 | 39 | 1.5 |
| Nova Scotia | 126 | 150 | 210 | 269 | 280 | 278 | 1.6 |
| New Brunswick | 99 | 117 | 167 | 211 | 219 | 213 | 1.6 |
| Quebec | 961 | 1,210 | 1,677 | 2,147 | 2,224 | 2,257 | 1.7 |
| Ontario | 1,492 | 1,844 | 2,593 | 3,549 | 4,078 | 4,415 | 2.2 |
| Manitoba | 155 | 167 | 228 | 295 | 319 | 335 | 1.5 |
| Saskatchewan | 148 | 150 | 195 | 249 | 262 | 281 | 1.3 |
| Alberta | 311 | 397 | 614 | 866 | 983 | 1,055 | 2.5 |
| BC | 541 | 662 | 965 | 1,292 | 1,449 | 1,565 | 2.1 |
| Yukon | 2 | 3 | 5 | 5 | 5 | 5 | 2.1 |
| NWT and Nunavut | 3 | 4 | 9 | 14 | 18 | 21 | 4.3 |

Source: Statistics Canada; C.D. Howe Institute projections as described in the text.

viewed in the light of the differing fiscal situations these projections produce), and

- Net international migration for each age/sex category into and out of each province continues at the 1992-to-2001 average figure for the entire projection period.

The resulting projections over the next half-century, highlighting the shares of the population younger than, part of, and older than the traditionally defined working-age population, are shown in Table 1. The key features of the results are: the shrinking share of the young population, with sharply declining numbers east of Ontario; deceleration in the working-age population nationwide, with declines in the East, and continued growth in the population 65 and over, which increases its share of the total population everywhere, and especially in the eastern provinces.

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**Table 2:** ***Growth of Real GDP, 2001–2051***

| | 2001–11 | 2011–21 | 2021–31 | 2031–41 | 2041–51 | Total 2001–51 |
|---|---|---|---|---|---|---|
| | | | *% change at annual rate* | | | |
| *Canada Total* | *2.7* | *1.8* | *1.5* | *1.7* | *1.5* | *1.8* |
| Newfoundland | 1.6 | 0.6 | 0.3 | 0.4 | 0.1 | 0.6 |
| PEI | 2.1 | 1.0 | 0.9 | 1.2 | 0.7 | 1.2 |
| Nova Scotia | 2.0 | 1.1 | 0.7 | 1.0 | 0.8 | 1.1 |
| New Brunswick | 1.8 | 0.8 | 0.5 | 0.7 | 0.5 | 0.9 |
| Quebec | 2.1 | 1.3 | 0.9 | 1.3 | 1.1 | 1.3 |
| Ontario | 3.0 | 2.1 | 1.7 | 1.9 | 1.8 | 2.1 |
| Manitoba | 2.5 | 1.6 | 1.5 | 1.8 | 1.6 | 1.8 |
| Saskatchewan | 2.3 | 1.6 | 1.5 | 1.8 | 1.4 | 1.7 |
| Alberta | 2.8 | 1.7 | 1.3 | 1.4 | 1.2 | 1.7 |
| BC | 2.8 | 1.8 | 1.6 | 1.8 | 1.6 | 1.9 |
| Yukon | 1.8 | 1.3 | 1.0 | 1.8 | 1.1 | 1.4 |
| NWT and Nunavut | 3.5 | 2.4 | 2.1 | 1.9 | 1.7 | 2.3 |

Source: C.D. Howe Institute projections as described in the text.

## *Provincial Gross Domestic Product*

I project future GDP for each province by multiplying its projected population of labour-force age by an index of output per person in that age-group. Each province's index is projected to grow at the same rate as the equivalent national measure from 1981-to-2001: just less than 1.6 percent annually.

The resulting growth rates over the 2001-to-2051 period are shown in Table 2. Because I assume the same growth rate of output per working-age person everywhere, the contrasting provincial growth rates are purely a function of contrasting growth rates in the population age 15-to-64 — more rapid in Ontario and the West than in Quebec and the East. Nominal GDP growth is simply real GDP growth times the price level. Consistent with the no-policy-change assumption that is central to the calculation of implicit assets and liabilities associated with programs, I assume that prices will rise at the Bank of Canada's targeted rate of 2 percent annually throughout the projection period.

## *Publicly Funded Health Care*

My projections for publicly funded health care make use of six age-groups for each sex in each province. I take figures from the Canadian Institute for Health Information for spending by age and sex in 2000 on services from hospitals, doctors, other professionals and drugs. I then prorate spending per person of each age and sex to obtain a total that matches aggregate national spending for 2001.[3] Table 3 summarizes the data, highlighting the markedly higher average servicing intensity of the population 65 and over.

I base my projections for health spending on the assumption that servicing intensity per person in each age/sex group rises at the same rate as the index of economy-wide output per person of traditional working age. I also assume that

3 http://secure.cihi.ca/cihiweb/en/media_18dec2002_tab9_e.html, visited 13 May, 2003.

**Table 3:** ***Provincial/Territorial Public Health Spending, 2001***

| | Total | Share of GDP | Per person 0–64 | Per person 65+ |
|---|---|---|---|---|
| | $ mn | % | $ | |
| *Canada Total* | *68,806* | *6.3* | *1,433* | *7,625* |
| Newfoundland | 1,362 | 9.7 | 1,692 | 8,948 |
| PEI | 287 | 8.3 | 1,263 | 7,345 |
| Nova Scotia | 1,854 | 7.4 | 1,178 | 7,083 |
| New Brunswick | 1,606 | 7.9 | 1,335 | 7,373 |
| Quebec | 15,406 | 6.7 | 1,280 | 7,443 |
| Ontario | 25,529 | 5.8 | 1,393 | 7,416 |
| Manitoba | 2,799 | 7.9 | 1,604 | 7,745 |
| Saskatchewan | 2,248 | 6.8 | 1,442 | 6,739 |
| Alberta | 7,130 | 4.7 | 1,650 | 8,319 |
| BC | 10,169 | 7.7 | 1,600 | 8,286 |
| Yukon | 93 | 8.1 | 2,491 | 13,171 |
| NWT and Nunavut | 323 | 8.4 | 4,061 | 20,420 |

Sources: Statistics Canada; Canadian Institute for Health Information.

inflation in the publicly funded health sector is the same as that in the broader economy.[4]

Because the federal government is a relatively modest direct provider of health services, and no obvious way of linking Ottawa's spending to age-groups exists, I do not extend these calculations to the federal government. While Ottawa recently responded to pressure to increase its transfers to the provinces in support of health care, the absence of any formal link between provincial health spending and federal transfers means that, in an *as-is* policy-situation, future increases in health spending are aptly modeled as a burden for the provinces to face alone.

## *Publicly Funded Education*

For education, my principal source is consolidated provincial and local government spending on elementary and secondary education and on postsecondary education from the Financial Management System.[5] Table 4 shows the key figures. I project elementary and secondary spending forward based on the sizes of provincial populations aged 4-to-17 and post-secondary spending on the basis of populations aged 18-to-24.

I assume that direct spending on education services, which constitutes the bulk of spending in this table, grows at the same rate per beneficiary as the index of output per person of traditional working age — the same assumption I adopt for

4 Variations in these assumptions, not surprisingly, can produce very different outcomes. Robson (2002) explores some alternative scenarios in health-care, with a focus on the extent of pre-funding (along CPP lines) that would stabilize current tax costs. I examine the sensitivity of my results to a lower economy-wide rate of output growth per working-age person below.

5 Statistics Canada (2002, pp. 27–28). Formally, the FMS shows both provincial and local governments contributing to spending on elementary and secondary education. Since provincial governments have now assumed almost total control over education funding, I show all these amounts as activities of provincial governments.

**Table 4:** ***Publicly Funded Education Spending, 2001***

| | Elementary and Secondary | | | Postsecondary | | |
|---|---|---|---|---|---|---|
| | Total | Share of GDP | Per Person 4–17 | Total | Share of GDP | Per Person 18–24 |
| | *$ mn* | *%* | *$* | *$ mn* | *%* | *$* |
| *Canada Total* | *35,451* | *3.2* | *6,191* | *23,456* | *2.1* | *7,932* |
| Newfoundland | 589 | 4.2 | 6,283 | 433 | 3.1 | 8,070 |
| PEI | 161 | 4.7 | 5,943 | 103 | 3.0 | 7,498 |
| Nova Scotia | 892 | 3.6 | 5,295 | 855 | 3.4 | 9,734 |
| New Brunswick | 878 | 4.3 | 6,607 | 468 | 2.3 | 6,514 |
| Quebec | 7,843 | 3.4 | 6,114 | 5,475 | 2.4 | 7,757 |
| Ontario | 13,689 | 3.1 | 6,168 | 7,994 | 1.8 | 7,318 |
| Manitoba | 1,293 | 3.7 | 5,603 | 869 | 2.5 | 7,910 |
| Saskatchewan | 1,221 | 3.7 | 5,726 | 806 | 2.4 | 7,709 |
| Alberta | 4,326 | 2.9 | 7,100 | 2,673 | 1.8 | 8,323 |
| BC | 4,238 | 3.2 | 5,867 | 3,106 | 2.4 | 8,053 |
| Yukon | 72 | 6.3 | 11,436 | 31 | 2.7 | 11,380 |
| NWT and Nunavut | 249 | 6.5 | 12,557 | 80 | 2.1 | 10,148 |
| Federal | — | — | — | 897 | 0.1 | * |

* Federal spending includes the CESG, making scaling to 18–24 age-group inappropriate.

Source: Receiver General for Canada 2002; Statistics Canada.

health care. I also, in similar fashion, assume that inflation in the publicly funded education sector is the same as that in the broader economy.

Federal direct spending on elementary and secondary education is, like federal direct spending on health, small and hard to relate to demographic developments, so I leave it out. Federal spending on postsecondary education falls into three categories. I ignore the portion that represents grants to institutions on the grounds that its connection with instruction, and hence its potential gearing to the university-age population, is very indirect. I gear grants to students to growth in the population aged 18-to-24 and the same index of servicing intensity just described. The Canada Education Saving Grant (CESG) is fixed in dollar terms and its changes are therefore driven only by alterations in the relevant population, which I take to be the population of pre-university age: 0-to-17.

## *Elderly Benefits*

The key data source for my modeling of elderly benefits is the projections from the Office of the Chief Actuary (OCA) on the federal system of Old Age Security, Guaranteed Income Supplement and Allowances payments (which I refer to for convenience as the OAS/GIS system). I calculate a series of real (inflation-adjusted) benefits per person age 65 and over from the OCA numbers. I then insert that series in my model and project total nominal OAS/GIS expenditures on the basis of my own population and inflation assumptions to get the federal numbers.[6]

6 Here again, the *as-is* policy assumption merits emphasis. It may be that political pressure from the elderly will result in increases in elderly benefits higher than current program features would indicate — ad hoc increases to keep pace with the purchasing power of the working population better than inflation indexation alone will achieve, for example. Since such extra increases are not built into the current program, I do not model them here.

**Table 5:** ***Elderly Benefits, 2001***

| | Total | Share of GDP | Per Person 65+ | Key Programs |
|---|---|---|---|---|
| | $ *mn* | % | $ | |
| *Canada Total* | *25,688* | *2.35* | *6,556* | |
| Newfoundland | 15 | 0.11 | 244 | Low-income Seniors Benefit |
| PEI | — | — | — | |
| Nova Scotia | — | — | — | |
| New Brunswick | 3 | 0.02 | 46 | Low-income Seniors Benefit |
| Quebec | — | — | — | |
| Ontario | 58 | 0.01 | 39 | GAINS-A; Sales and Property Tax Grants |
| Manitoba | 7 | 0.02 | 47 | Supplement for Pensioners |
| Saskatchewan | 12 | 0.04 | 83 | Saskatchewan Income Plan |
| Alberta | 212 | 0.14 | 681 | Assured Income Plan; Seniors Benefit; Widows' Pension |
| BC | 13 | 0.01 | 24 | GAIN for Seniors Supplement |
| Yukon | — | — | — | |
| NWT and Nunavut | — | — | — | |
| Federal | 25,365 | 2.32 | 6,474 | OAS/GIS and Spouses' Allowance |

Sources: Receiver General for Canada 2002; Statistics Canada SPSD/M.

Note: All simulations were estimated using Statistics Canada's Social Policy Simulation Database and Model, Release 9.0. Responsibility for the use and interpretation of these data rests solely with the author.

The same approach is not possible for the provinces that provide elderly benefits: they do not, to my knowledge, produce similar projections for their programs. Instead, I take total spending on these programs in 2001 from SPSD/M,[7] and adopt the simple expedient of assuming that the same time-path of servicing intensity (or, more precisely, *transfer intensity*) applies to provincial as to federal programs — in other words, that the provincial programs for the elderly have a similar mix of universal and means-tested elements. An investigation of the parameters of provincial programs would produce different results. As the provincial programs in this area are relatively small, however, such modifications would not likely make much difference to the overall results of this study.

An important category of public pension programs I do not model is the CPP and QPP. The CPP and QPP resemble employer-sponsored defined-benefit pension plans in that participants earn their entitlement to benefits by taking part in and contributing to the plans. This link between entitlement and participation allows estimation of the benefits that current and past participants have earned at a point in time and, with assumptions about future demographics, earnings and rate-of-return variables, estimation of how much money the plans would have to keep on hand to pay those benefits if further benefit accruals and contributions were to cease. The difference between the obligations and the assets actually held in the plan is the unfunded liability. Because the Office of the Chief Actuary already produces such an estimate for the CPP, I do not produce my own here, but add that estimate, and a corresponding amount for the QPP, in my overall tally below.

7 All simulations were estimated with Statistics Canada's Social Policy Simulation Database and Model, Release 9.0. Responsibility for the use and interpretation of these data rests solely with the author.

**Table 6: *Child and Family Benefits, 2001***

| | Total | Share of GDP | Per Person 0-17 | Key Programs |
|---|---|---|---|---|
| | $ mn | % | $ | |
| *Canada Total* | *8,538* | *0.78* | *1,204* | |
| Newfoundland | 6 | 0.04 | 55 | Child benefit |
| PEI | — | — | — | |
| Nova Scotia | 21 | 0.08 | 101 | Child benefit |
| New Brunswick | 14 | 0.07 | 86 | Child benefit |
| Quebec | 443 | 0.19 | 280 | Provincial family allowance; availability allowance |
| Ontario | 228 | 0.05 | 83 | Refundable Child-care Expense Tax Credit |
| Manitoba | — | — | — | |
| Saskatchewan | 71 | 0.21 | 268 | Child benefit; Employment Supplement |
| Alberta | 60 | 0.04 | 79 | Family Employment Tax Credit Benefits |
| BC | 138 | 0.10 | 155 | Family Bonus |
| Yukon | — | — | — | |
| NWT and Nunavut | — | — | — | |
| Federal | 7,557 | 0.69 | 1,066 | Child Benefit |

Sources: Receiver General for Canada 2002; Statistics Canada SPSD/M.

## *Child Benefits*

For child and family benefits, I also use 2001 totals from SPSD/M for the provinces (adjusted to remove Quebec's allowance for infants, which has just been phased out). Federal spending on the Child Benefit is from the federal Public Accounts. I calculate the amounts relative to the populations age 0-to-17 in the respective jurisdictions (Table 6 summarizes the key figures).

The projections assume that all the relevant per-recipient amounts are indexed to inflation only — that is, the servicing/transfer intensity per person in the 0-to-17 age-group is constant in real terms — so the nominal amount grows with the population and overall inflation.

## *Quantifying the Changes*

Converting these projections into amounts that can be expressed as assets and liabilities requires both a baseline against which to compare future spending and a time horizon over which to value the difference. My approach is to think about these programs as implicit promises governments have made to Canadians currently alive. Specifically, governments have implicitly committed to provide transfers and public services of similar generosity and quality, and on substantially the same terms, in the future as they do today.[8]

The projections just described represent the profile of public services and transfers of similar generosity and quality. In my view, the cost side is best

8 Veldhuis and Emes (2003, 16) show an unfunded liability related to OAS in 2000 of $434 billion, far larger than the figure I calculate. Theirs is a closed cohort calculation in which revenues from future taxpayers play no part. It also rests on income-growth assumptions more pessimistic than those I use in my base case, but closer to those I use in looking at the sensitivity of my projections to productivity growth below. Their amount may also be sensitive to their use of the personal income tax alone in projecting future tax payments by participants, since aging affects the personal income-tax base more than alternatives such as sales taxes.

represented by the price paid over a recent period, for which a program's cost relative to GDP in the most recently available year seems a reasonable benchmark. The projected decrease or increase in the program's cost over that share of GDP is the change in the apparent tax-cost of the benefits that, being built into the program's structure, is implicitly promised.

This way of thinking about these assets and liabilities imposes a limit on the time horizon over which to value them. Infinity is clearly too long: one cannot say anything sensible about what governments have promised to current voters' unborn children. An alternative would be to adopt horizons specific to the people to whom different promises apply, but this approach would founder on the difficulty that different time-scales would apply to the spending and revenue sides, rendering a single figure for both incoherent. My preference is to adopt a 50-year horizon — using 2001 as a base year, and evaluating the difference in spending relative to GDP over the period 2002-to-2051 — for all programs, on the grounds that this is approximately the life expectancy of the average-age Canadian. Figure 1 shows the projected total figures for health, education, elderly benefits and child benefits from all levels of government, relative to GDP, from 2001 to 2051.

An implicit asset or liability associated with a program calculated in this way has a ready interpretation that makes clear its comparability with familiar measures such as net public debt and the CPP's unfunded liability. In the case of an asset, it is the amount of additional debt that, at the assumed rate of return/discount rate, a government could service and still keep aggregate tax rates stable over 50 years, as the falling costs of the program offset the cost of paying interest on this imaginary amount. In the case of a liability, it is the interest-yielding fund that the government would need to hold to discharge the obligation in question without increasing the share of national income that it taxes. It is, therefore, a measure of the gap between the benefits of public programs and their apparent cost, as seen by current recipients and taxpayers — similar to the bonus or wedge that net assets or net debt place between program benefits and tax costs and the unfunded liability in the C/QPP that will require future contributors to pay more than an actuarially fair rate for their benefits.[9]

Producing a present-value estimate of these assets and liabilities requires a discount rate. Aside from the arguments, which I do not pursue here, favouring different benchmarks for different classes of assets and liabilities, the key issue — one that recent concern about the funding of pension plans has highlighted — is the overall rates of return that are reasonable to expect in the longer-term.

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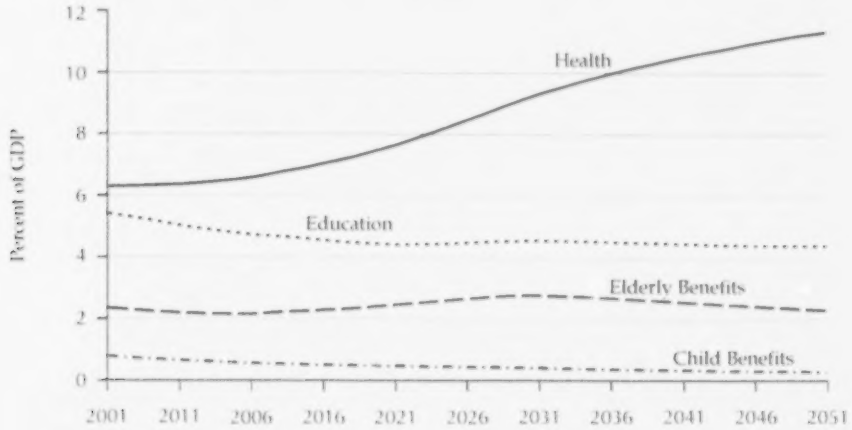
9 Demographic change will affect government revenues and expenditures beyond those modeled here. In some cases, such as Employment Insurance and Worker's Compensation, the existence of revenue sources that are formally tied to program expenditures and the relevant revenue base make this type of calculation inappropriate, since demographic change will move revenues and expenditures together. In others, such as spending on criminal justice, fewer young people may result in declining expenditures. A further and quantitatively more important extension would be to look at the implicit asset or liability represented by the likely evolution of different tax yields in the face of demographic change. The current distribution of tax liabilities by age and sex suggests that the passage of time will erode most tax bases, with the payroll tax base being highly vulnerable, the personal income tax less so, and the base for consumption taxes less yet (Robson 2002). I do not undertake such an exercise in this paper, although I do add deferred income taxes on pension saving to my overall tally.

**Figure 1:** ***Evolution of Spending on Major Programs — National Totals***




Because the predictions of different economic models vary considerably in this regard, I present two sets of figures. One uses a discount rate of 6 percent — about 4 percent in real terms — which is roughly the average yield on federal and provincial long bonds over the five-year period 1997-to-2001, and is also almost exactly equal to the yield on the federal real-return bond over that period turned into a nominal yield by multiplying by the 2-percent inflation rate targeted by the Bank of Canada. The other uses a discount rate of 5 percent — about 3 percent in real terms — which is closer to (though still greater than) the overall rate of income growth implied by any GDP projection model that, as mine does, compounds growth of the working-age population with a labour-productivity growth rate that resembles historical experience and is close to the current yield on the real-return bond multiplied by 2 percent inflation.

## The Tally

Bringing these implicit assets and liabilities into an extended fiscal balance sheet provides useful information about the sustainability of Canada's existing public programs, and about the extent to which demographically driven balance-sheet items offset each other. I now turn to the results of each category of the projection exercise in turn.

### *Publicly Funded Health Care*

The interaction of the age and sex profile of servicing intensity with demographic change produces particularly dramatic results in projections of budgets for publicly funded health care. Provinces in which slower or even negative growth in the working-age population coincides with rapid increases in the number of elderly face powerful pressure.

As Table 7 indicates, if the current distribution of spending holds into the future, the share of national GDP absorbed by publicly funded health programs

**Table 7:** ***Provincial/Territorial Public Health Spending, 2001–2051***

| | Share of GDP | | | | | | Implicit Asset/Liability in 2001 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | at 6% discount rate | | at 5% discount rate | |
| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | | | | |
| | % | | | | | | $ mn | % of GDP | $ mn | % of GDP |
| *Canada Total* | 6.3 | 6.6 | 7.6 | 9.3 | 10.5 | 11.3 | -652,045 | -59.7 | -902,292 | -82.6 |
| Newfoundland | 9.7 | 10.7 | 13.7 | 18.0 | 21.6 | 24.5 | -16,085 | -114.8 | -21,914 | -156.4 |
| PEI | 8.3 | 8.6 | 10.3 | 12.8 | 14.6 | 16.0 | -2,406 | -69.8 | -3,328 | -96.6 |
| Nova Scotia | 7.4 | 7.8 | 9.5 | 12.1 | 14.0 | 15.4 | -18,622 | -74.2 | -25,604 | -102.1 |
| New Brunswick | 7.9 | 8.4 | 10.4 | 13.3 | 15.6 | 17.1 | -16,143 | -79.3 | -22,120 | -108.7 |
| Quebec | 6.7 | 7.4 | 8.9 | 11.2 | 12.5 | 13.3 | -170,613 | -74.2 | -232,456 | -101.0 |
| Ontario | 5.8 | 6.0 | 6.8 | 8.1 | 9.2 | 9.9 | -230,185 | -52.0 | -320,205 | -72.3 |
| Manitoba | 7.9 | 7.8 | 8.7 | 10.2 | 11.2 | 11.8 | -13,442 | -38.1 | -19,145 | -54.2 |
| Saskatchewan | 6.8 | 6.5 | 7.1 | 8.2 | 8.9 | 9.5 | -7,476 | -22.5 | -10,880 | -32.7 |
| Alberta | 4.7 | 4.9 | 5.8 | 7.3 | 8.6 | 9.6 | -76,253 | -50.4 | -106,049 | -70.1 |
| BC | 7.7 | 8.0 | 9.3 | 11.3 | 13.0 | 14.2 | -96,488 | -73.5 | -134,545 | -102.5 |
| Yukon | 8.1 | 8.9 | 11.1 | 13.3 | 14.1 | 16.2 | -985 | -86.5 | -1,338 | -117.5 |
| NWT and Nunavut | 8.4 | 8.4 | 9.9 | 11.8 | 13.6 | 15.2 | -3,349 | -86.8 | -4,708 | -122.0 |

Source: Author's calculations as described in the text.

will come close to doubling after 50 years, with the most marked increases occurring in the eastern provinces. The projected increase in health budgets as a share of GDP arising from demographic change gives rise to a liability for provincial governments of $652 billion when valued at a 6-percent discount rate, and $902 billion at a 5-percent rate.

## *Publicly Funded Education*

The projections for education, not surprisingly, tell a different story. For provincial governments, the overall declining trend in publicly funded education's share of GDP is a combined result of a relatively rapid and early fall in its elementary and secondary component, reflecting the falling share of youngsters in most populations, and a longer-lagged decline in the post-secondary component (Table 8).

Although the federal government's very limited exposure to elementary and secondary education gives rise to no implicit asset in that component, the fixed-dollar amount of the CESG boosts the amount shown to its credit in the post-secondary component.

The national total implicit asset related to shrinking education expenditures is $263 billion at a 6-percent discount rate, and $336 billion at a 5-percent rate. More than two-thirds of these amounts arises from the decline in elementary and secondary spending, which is larger and happens sooner.

## *Elderly Benefits*

In the assessment of elderly benefits, most of the action is in the federal bailiwick (Table 9). Valued over 50 years at a 6-percent discount rate, the net projected increase in the cost of the OAS/GIS programs comes to an implicit liability of $20 billion.

**Table 8:** ***Public Education Spending, 2001–2051***

| | Share of GDP | | | | | | Implicit Asset /Liability in 2001 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | at 6% discount rate | | at 5% discount rate | |
| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | | | | |
| | % | | | | | | $ mn | % of GDP | $ mn | % of GDP |
| *Canada Total* | *5.4* | *4.7* | *4.4* | *4.5* | *4.4* | *4.4* | *263,132* | *24.1* | *335,635* | *30.7* |
| Newfoundland | 7.3 | 5.5 | 5.0 | 5.0 | 4.8 | 4.7 | 6,942 | 49.5 | 8,664 | 61.8 |
| PEI | 7.7 | 6.5 | 6.0 | 6.2 | 5.9 | 6.0 | 1,273 | 36.9 | 1,610 | 46.7 |
| Nova Scotia | 7.0 | 6.1 | 5.6 | 5.8 | 5.7 | 5.6 | 7,030 | 28.0 | 8,910 | 35.5 |
| New Brunswick | 6.6 | 5.6 | 5.3 | 5.4 | 5.3 | 5.3 | 5,657 | 27.8 | 7,084 | 34.8 |
| Quebec | 5.8 | 5.0 | 4.7 | 4.9 | 4.8 | 4.7 | 54,943 | 23.9 | 69,207 | 30.1 |
| Ontario | 4.9 | 4.4 | 4.1 | 4.2 | 4.2 | 4.1 | 91,216 | 20.6 | 117,085 | 26.4 |
| Manitoba | 6.1 | 5.5 | 5.2 | 5.4 | 5.3 | 5.2 | 7,886 | 22.3 | 10,043 | 28.4 |
| Saskatchewan | 6.1 | 5.2 | 4.9 | 5.1 | 4.9 | 4.9 | 9,797 | 29.4 | 12,477 | 37.5 |
| Alberta | 4.6 | 4.0 | 3.7 | 3.8 | 3.7 | 3.7 | 35,117 | 23.2 | 44,763 | 29.6 |
| BC | 5.6 | 4.9 | 4.7 | 4.8 | 4.6 | 4.6 | 32,168 | 24.5 | 41,357 | 31.5 |
| Yukon | 9.0 | 7.6 | 6.8 | 7.1 | 6.1 | 5.7 | 606 | 53.2 | 783 | 68.8 |
| NWT and Nunavut | 8.5 | 7.2 | 6.4 | 6.2 | 5.8 | 5.7 | 2,700 | 70.0 | 3,534 | 91.6 |
| Federal | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 7,796 | 0.7 | 10,118 | 0.9 |

Source: Author's calculations as described in the text.

This amount may seem surprisingly small. It reflects an anticipated decline in the current cost of these programs over the coming decade before they begin to mount in the next one (which is why discounting at the lower 5-percent rate produces a figure that is proportionately larger relative to the 6-percent calculation than the equivalent contrast in the other programs modeled might lead one to expect). The implicit liability I calculate is considerably less than the $130 billion that a similar valuation of the rising current cost of these programs in the OCA's projections would provide (Robson forthcoming). The difference is largely a function of the more optimistic assumptions about growth of output per working-age person in my projections, a point that I take up in the concluding section of this *Commentary*.

**Table 9:** ***Elderly Benefits, 2001–2051***

| | Share of GDP | | | | | | Implicit Asset/Liability in 2001 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | at 6% discount rate | | at 5% discount rate | |
| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | | | | |
| | % | | | | | | $ mn | % of GDP | $ mn | % of GDP |
| *Canada Total* | *2.4* | *2.2* | *2.5* | *2.8* | *2.5* | *2.3* | *-20,886* | *-1.9* | *-32,958* | *-3.0* |
| Newfoundland | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | -120 | -0.9 | -160 | -1.1 |
| PEI | — | — | — | — | — | — | — | — | — | — |
| Nova Scotia | — | — | — | — | — | — | — | — | — | — |
| New Brunswick | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -18 | -0.1 | -25 | -0.1 |
| Quebec | — | — | — | — | — | — | — | — | — | — |
| Ontario | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.1 | 0.0 | 45 | 0.0 |
| Manitoba | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 24.8 | 0.1 | 31 | 0.1 |
| Saskatchewan | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 64.0 | 0.2 | 81 | 0.2 |
| Alberta | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | -1,138 | -0.8 | -1,594 | -1.1 |
| BC | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -12 | -0.0 | -19 | -0.0 |
| Yukon | — | — | — | — | — | — | — | — | — | — |
| NWT and Nunavut | — | — | — | — | — | — | — | — | — | — |
| Federal | 2.3 | 2.1 | 2.4 | 2.7 | 2.5 | 2.3 | -19,730 | -1.8 | -31,315 | -2.9 |

Source: Author's calculations as described in the text.

**Table 10:** ***Child and Family Benefits, 2001–2051***

| | Share of GDP | | | | | | Implicit Asset /Liability in 2001 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | at 6% discount rate | | at 5% discount rate | |
| | 2001 | 2011 | 2021 | 2031 | 2041 | 2051 | | | | |
| | | | % | | | | $ mn | % of GDP | $ mn | % of GDP |
| *Canada Total* | *0.8* | *0.6* | *0.5* | *0.4* | *0.3* | *0.3* | *102,727* | *9.4* | *133,711* | *12.2* |
| Newfoundland | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 71 | 0.5 | 89 | 0.6 |
| PEI | — | — | — | — | — | — | — | — | — | — |
| Nova Scotia | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 220 | 0.9 | 283 | 1.1 |
| New Brunswick | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 137 | 0.7 | 176 | 0.9 |
| Quebec | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 4,605 | 2.0 | 5,953 | 2.6 |
| Ontario | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2,948 | 0.7 | 3,861 | 0.9 |
| Manitoba | — | — | — | — | — | — | — | — | — | — |
| Saskatchewan | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 821 | 2.5 | 1,067 | 3.2 |
| Alberta | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 737 | 0.5 | 956 | 0.6 |
| BC | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 1,685 | 1.3 | 2,202 | 1.7 |
| Yukon | — | — | — | — | — | — | — | — | — | — |
| NWT and Nunavut | — | — | — | — | — | — | — | — | — | — |
| Federal | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 91,502 | 8.4 | 119,126 | 10.9 |

Source: Author's calculations as described in the text.

In most cases, the provincial programs providing income support to seniors are relatively small in size. Only in the cases of Newfoundland and Alberta does the discounted increase in their shares of provincial GDP give rise to implicit liabilities of the order of 1 percent of GDP.

## *Child Benefits*

Taking implicit balance-sheet amounts into account in the area of child and family benefits also makes the biggest difference to the federal government (Table 10), thanks to its recent rapid expansion of the Child Benefit, a program that will be under powerful demographic pressure to shrink. Ottawa's implicit asset from this program amounts to some $92 billion at a 6-percent discount rate, or $119 billion at 5 percent.

The recent tendency of the federal Child Benefit to expand makes it apt to draw attention to a feature of this analysis that may appear peculiar: discretionary enrichments in these programs expand the implicit asset associated with them.[10] This result is not perverse. It simply reflects the greater long-term affordability of programs that, under the assumption of stable parameters — the *as-is* policy assumption — will become less important as demographic changes reduce their current tax cost over time.

Among the provinces, the changes from current levels in these programs in individual years are not typically very large relative to GDP, but their discounted size in some cases is not negligible. Quebec and Saskatchewan stand to reap the largest gains — 2-to-3 percent of current GDP — from their shrinking relative populations of children.

10 If current spending on the Child Benefit had been $1 billion larger in 2001, for example, the implicit asset shown in Table 10 would have risen from $92 billion to $104 billion.

**Table 11:** ***Summary of Demographically Driven Fiscal Adjustments***

| | Health | Education | Elderly Benefits | Child/Family Benefits | Subtotal | Subtotal as Share of 2001 GDP |
|---|---|---|---|---|---|---|
| | | | *($ bn)* | | | *%* |
| *Canada Total* | *–652.0* | *263.1* | *–20.9* | *102.7* | *–307.1* | *–28.1* |
| Newfoundland | –16.1 | 6.9 | –0.1 | 0.1 | –9.2 | –65.6 |
| PEI | –2.4 | 1.3 | — | — | –1.1 | –32.9 |
| Nova Scotia | –18.6 | 7.0 | — | 0.2 | –11.4 | –45.3 |
| New Brunswick | –16.1 | 5.7 | –0.1 | 0.1 | –10.4 | –50.9 |
| Quebec | –170.6 | 54.9 | — | 4.6 | –111.1 | –48.3 |
| Ontario | –230.2 | 91.2 | 0.0 | 2.9 | –136.0 | –30.7 |
| Manitoba | –13.4 | 7.9 | 0.0 | — | –5.5 | –15.7 |
| Saskatchewan | –7.5 | 9.8 | 0.1 | 0.8 | 3.2 | 9.6 |
| Alberta | –76.3 | 35.1 | –1.1 | 0.7 | –41.5 | –27.5 |
| BC | –96.5 | 32.2 | –0.0 | 1.7 | –62.6 | –47.7 |
| Yukon | –1.0 | 0.6 | — | — | –0.4 | –33.3 |
| NWT and Nunavut | –3.3 | 2.7 | — | — | –0.6 | –16.8 |
| Federal | — | 7.8 | –19.7 | 91.5 | 79.6 | 7.3 |

## An Augmented Balance Sheet for Canadian Governments

It is natural to wonder what all these items look like added together.

The net impact of the programs considered here is negative. The aging population appears set to increase the share of GDP devoted to publicly funded health care and elderly benefits considered together more than it will shrink the share of GDP going to publicly funded education and child benefits. As the summary figures shown in Table 11 (calculated at a 6-percent discount rate) indicate, however, the situation across the country varies both regionally and by level of government.

From a regional perspective, most of the large numbers are found in the East, where the combined pressures of aging and slow or negative growth in the working-age population are most acute. In the prairie provinces, the situation is much better, with Saskatchewan — where a relatively low ratio of health spending on the elderly versus the younger population contains the demographic pressure on publicly funded health care — standing out for its positive net exposure to demographic change.

The distribution between the federal government on the one hand and provincial governments on the other also merits a comment. The federal government's situation looks relatively good. Ottawa can look forward to reductions in the share of GDP required to finance the Child Benefit and its support for post-secondary students, amounts that more than offset its exposure to the OAS/GIS system. The provinces look less well off. While they can anticipate declining program costs related to young people, their sizeable implicit liability related to future health spending outweighs these assets, and leaves them with a net liability close to $390 billion.[11]

11 One might object to the implied dollar-for-dollar offset between education-related assets and health-care-related liabilities on the grounds that it effectively assumes costless conversion of schools into nursing homes and teachers into nurses. But the baseline spending levels in both already includes a lot of such frictional costs.

**Table 12:** ***Demographically Driven Fiscal Adjustments in Overall Fiscal Context Context***

| | Demographically Driven Subtotal (2001) | C/QPP (2000) | Deferred Pension Tax (1999) | FMS Net Debt (Various)* | Total | Total as Share of 2001 GDP |
|---|---|---|---|---|---|---|
| | | | ($ bn) | | | % |
| *Canada Total* | *-307.1* | *-581.5* | *375.8* | *-789.0* | *-1,301.7* | *-119.2* |
| Newfoundland | -9.2 | -5.0 | 1.8 | -9.4 | -21.8 | -155.8 |
| PEI | -1.1 | -1.3 | 0.5 | -1.1 | -3.0 | -87.6 |
| Nova Scotia | -11.4 | -8.8 | 3.9 | -11.4 | -27.7 | -110.5 |
| New Brunswick | -10.4 | -7.1 | 2.9 | -6.5 | -21.1 | -103.5 |
| Quebec | -111.1 | -69.3 | 51.7 | -100.9 | -229.5 | -99.8 |
| Ontario | -136.0 | -111.1 | 68.6 | -103.1 | -281.6 | -63.5 |
| Manitoba | -5.5 | -10.8 | 5.4 | -9.7 | -20.6 | -58.4 |
| Saskatchewan | 3.2 | -9.5 | 3.8 | -8.4 | -10.9 | -32.9 |
| Alberta | -41.5 | -28.7 | 17.1 | 9.6 | -43.5 | -28.7 |
| BC | -62.6 | -38.3 | 18.5 | -13.6 | -96.0 | -73.1 |
| Yukon | -0.4 | -0.3 | 0.1 | 0.3 | -0.3 | -22.3 |
| NWT and Nunavut | -0.6 | -0.6 | 1.5 | 0.0 | 0.1 | 3.5 |
| Federal | 79.6 | -290.7 | 200.0 | -534.7 | -545.9 | -50.0 |

Source: OCA 2001; Robbins and Veall 2002; Statistics Canada; author's calculations.

* Federal net debt as of March 31, 2002; provincial net debt as of March 31, 2001; local net debt as of December 31, 2000.

## Closing Thoughts

These types of calculations suggest several directions for further research and policy analysis. In this closing section, I touch on three. First, I put them in the context of other balance-sheet measures that, in combination, provide a fuller picture of Canadian governments' long-term fiscal situation than the measures normally cited. Second, I show how sensitive they are to different assumptions about the underlying rate of labour productivity growth. Finally, I make some comments about policy responses.

### *The Larger Fiscal Context*

The tally in Table 11 can easily be augmented by three other pertinent amounts: unfunded liabilities of the C/QPP system; deferred taxes on private pension saving; and the consolidated Financial Management System (FMS) government balance sheets from Statistics Canada.

### *The Canada and Quebec Pension Plans*

As discussed earlier, the Office of the Chief Actuary estimates the amount of money the CPP would need to have on hand to pay benefits accrued to date if further benefit accruals and contributions were to cease. The difference between that obligation and the assets in the plan is its unfunded liability. Although the actuarial projections of the QPP do not provide an estimate of the unfunded liability, the similarity of the QPP to the CPP allows a reasonable approximation.

Assets in the CPP and QPP were $44 billion and $18 billion respectively on December 31, 2000, (OCA 2001, 113; Québec 2001, 49) for a total of $62 billion. On

the liability side, the Office of the Chief Actuary (OCA 2001, 113) calculated a figure at December 31, 2000, of $487 billion for the CPP. I estimate the QPP liability by assuming that it is proportional to the ratio of Quebec's population age 15 and over to that of the rest of Canada — 32 percent — which yields a value of $156 billion. The difference between the assets and the liabilities of the two plans amounts to an unfunded liability for the CPP of $443 billion, and for the QPP of $139 billion.

Dividing these amounts among the federal and provincial governments involves some arbitrary judgments. Formally, the CPP is a joint federal-provincial program, while the QPP is a provincial program that is legally required to offer similar benefits. The regional distribution I use allocates half the unfunded liability of the CPP and QPP alike to the federal government, distributes the rest of the CPP's liability among the provinces other than Quebec according to their shares of population 15 and over, and shows the rest of the QPP's liability as an obligation of the Quebec government. The result, shown in the second column of Table 12, is a further obligation of Canadian governments that, if updated to 2001, would probably run to $600 billion.[12]

## *Deferred Taxes on Private Pension Saving*

A further sensible addition to this longer-term evaluation of fiscal positions is tax that will be payable on savings in employer-sponsored registered pension plans or registered retirement saving plans when they are taken into personal income. Robbins and Veall (2002) estimate that these savings came to as much as $1 trillion at the end of 1999.

A handful of assumptions permit a valuation of these assets that is comparable with other financial liabilities and assets. I follow Robbins and Veall (2002) in assuming that a 20-percent average federal tax rate will apply to the distributions from these plans. I also follow Robbins and Veall in assuming that the rate of return on investments in the plan is the same as the discount rate — for which I again use my benchmark rate of 6 percent — which makes the present value of tax-deferred pension savings to governments equal simply to the amount saved times the pertinent tax rate. I therefore show $200 billion for the federal government in this category. Using the current distribution of income taxes among federal and provincial governments from the FMS as a guide, I calculate the equivalent amounts for each province to obtain the third column in Table 12, showing a substantial implicit asset — $376 billion in total — for Canadian governments.

## *FMS Measures of Public-Accounts Net Debt*

The third column in Table 12 shows the most recent net debt figures for the federal and provincial-local governments as calculated in the FMS (Statistics Canada, 2003). These figures, which are consistent with traditional public-accounts definitions,

12 I note, though I do not pursue it further here, that long-term returns assumed in the valuation of the CPP's actuarial liability are roughly 6.6 percent. Using a 6-percent rate of return in valuing the CPP would raise its liability and, following the pro-rating method I use here, the QPP's liability also.

overstate the long-term net liability of these governments to some extent because they include only financial assets on the credit side. Their consistent basis across governments, however, makes them a good source for this tally.

The total of all these items — a demographically augmented balance sheet — appears in the final column of Table 12. At $1.3 trillion, about 120 percent of 2001 GDP, the net obligation is more than half again as large as the net figure in the more familiar FMS balance sheets alone. The addition of the demographically driven components to government balance sheets illustrates, notwithstanding the implicit assets arising from a relatively smaller young population in the future, that the current structure of programs implies that the tax cost of the mix of programs and transfers Canadians now enjoy will rise.

### *Sensitivity to Productivity Growth Assumptions*

A number of the assumptions underlying these projections are open to debate. Most notably, cost and servicing intensity in health and education programs might not rise in line with their counterparts in the broader economy. The full range of such contingencies is infinite, but one alternative projection can illustrate the scale of the sensitivity.

Suppose that, rather than growing at its 1981-to-2001 rate of slightly less than 1.6 percent annually, output per person 15-to-64 were to grow only 1 percent annually in the future. There are many reasons to think that an older, slower-growing workforce will retard the increase in output per potential worker: if aging lowers the national saving rate, growth in capital inputs may slow as well; and there is evidence from cross-country and time-series studies that movement of a greater share of the potential workforce into its 60s is associated with lower productivity (Guillemette 2003). If that were to happen, while the increase in servicing intensity in the health and education sectors were to continue at the rate assumed in the base case, the demographically driven assets and liabilities of Canadian governments shown in Table 11 would instead look as shown in Table 13.

The slower growth in the economic base on which these programs rest has a very large impact on the present values of the decreases or increases in shares of GDP they will absorb. It increases the liabilities associated with health care and elderly benefits, and decreases the assets associated with education and child benefits. In this bleaker scenario, no government is in a positive position. The federal situation with regard to OAS/GIS becomes closer to what is implied by the OCA's calculations, more than offsetting Ottawa's favourable exposure to post-secondary education and the Child Benefit. For the public sector as a whole, the demographically driven total net liability from these programs stands at some $905 billion under that scenario, more than 80 percent of 2001 GDP.

## Policy Implications

The longer-term-oriented tally confirms, in qualitative terms, the conclusions drawn by generational accounting exercises (Oreopoulos and Vaillancourt 1998):

**Table 13:** ***Demographically Driven Fiscal Adjustments with 1% Labour Productivity Growth***

| | Health | Education | Elderly Benefits | Child/Family Benefits | Subtotal | Subtotal as Share of 2001 GDP |
|---|---|---|---|---|---|---|
| | | | *($ bn)* | | | % |
| *Canada Total* | *–904.9* | *47.8* | *–116.0* | *71.3* | *–901.8* | *–82.6* |
| Newfoundland | –19.7 | 4.2 | –0.2 | 0.1 | –15.6 | –111.3 |
| PEI | –3.3 | 0.5 | — | — | –2.8 | –82.6 |
| Nova Scotia | –24.3 | 1.7 | — | 0.2 | –22.4 | –89.4 |
| New Brunswick | –20.7 | 1.8 | 0.0 | 0.1 | –18.9 | –92.7 |
| Quebec | –220.0 | 12.3 | — | 3.2 | –204.5 | –88.9 |
| Ontario | –334.3 | 2.8 | –0.2 | 2.0 | –329.7 | –74.4 |
| Manitoba | –23.6 | 0.1 | 0.0 | — | –23.5 | –66.6 |
| Saskatchewan | –15.4 | 2.6 | — | 0.6 | –12.2 | –36.7 |
| Alberta | –102.1 | 9.7 | –1.9 | 0.5 | –93.8 | –62.0 |
| BC | –135.4 | 4.1 | –0.1 | 1.2 | –130.1 | –99.1 |
| Yukon | –1.3 | 0.3 | — | — | –1.0 | –88.3 |
| NWT and Nunavut | –1.3 | 0.3 | — | — | –1.0 | –88.3 |
| Federal | — | 6.6 | –113.7 | 63.5 | –43.6 | –4.0 |

Source: author's calculations.

that average future taxpayers will pay a price greater than the value of the government services and transfers they receive in return.

One recommendation that follows straightforwardly from these calculations is that Canadian governments should not allow current fiscal pressures to lead them back into deficits. The base case indicates that sustaining the current program mix would require no increase in taxes if Canada's public sector, in aggregate, could draw on a stock of funds of about $300 billion, yielding 6 percent, to cover its rising cost relative to GDP. Paying down more of the existing stock of debt would accomplish the same goal. If maintaining ordinary budget surpluses is too hard, an attractive alternative would be to pre-fund specific programs where demographically driven liabilities loom especially large. Health programs, especially components such as drugs that are very strongly geared to age, might be good candidates for such treatment, since Canadians may be more open to paying higher taxes for health care than for government programs generally (Robson 2002).

A second recommendation follows from the fact that this longer-term tally shows that provincial governments are facing the toughest pressures. It is a commonplace that a dynamic vertical fiscal imbalance exists in Canada, with the federal government having access to revenue sources that are more robust over time, while the provincial governments face the faster-growing obligations.[13] This tally does not suggest that Canadians can look forward to lower aggregate tax rates in the future. It does, however, suggest that — barring an effective transfer of much of the net provincial liability to Ottawa through an increase in federal-provincial transfers so large as to raise serious concerns about political accountability — Ottawa should not react to its relatively attractive situation by

13 Ruggieri (2002) has recently restated this thesis, although Norrie (2002) argues persuasively that the imbalance is more a reflection of federal and provincial choices with regard to taxation than a preordained fact.

increasing spending, but should lower taxes to create fiscal room that the provinces are likely to need.

The enormous sensitivity of the overall tally to different assumptions about economy-wide productivity growth suggests a final recommendation. Economic and social policy analysis often contains trade-offs between efficiency and equity — the need to balance policies that support growth in aggregate incomes against those that support more equitable distribution and generously funded public services. A long-term perspective blurs this distinction. The strongest imaginable support for high-quality public services and generous transfers is an economy that generates high incomes. The stress of aging on public programs will be easier to deal with the more government policies encourage work, saving, investment and productivity growth. Growth in output per working-age person of 1.9 percent annually would essentially cause the net national demographically driven liability calculated here to disappear. Raising long-term growth by such an amount will not be easy, but it would secure Canada's social programs more effectively than any marginal program-design modifications or royal commissions could do. Governments should be cautious about expanding programs in which demographic changes create an implicit liability, and energetic in pursuing reforms that will accelerate the growth of the economy that ultimately sustains them.

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